**SAMPLE QUIZ PAPER**

1. A programming instruction that tells the controller to execute a program only if conditions are true is called **conditional control routine**.
2. To start a condition a **latch** is used across the condition.
3. When tasks involved in a control system are to be done in a certain order control , it is said to be **sequential control.**

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1. In an automatic grain store, the three motors are used to control the **elevator, cyclone** **and conveyor worm.**
2. In the automatic grain store, the sequence of switching on is as follows

**Conveyor worm cyclone elevator**

1. In the automatic grain store, the sequence of switching off is as follows

**elevator cyclone Conveyor worm**

**II.** State whether the following statements are true or false.

1. EMERGENCY STOP must have priority over all other operations - True

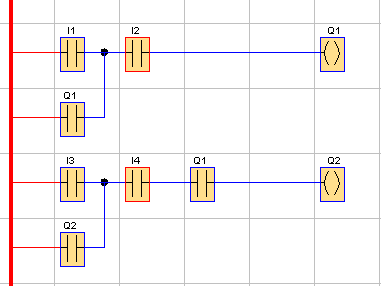
2. Resetting of the EMERGENCY STOP must result in switching-on of the plant again. - False

3. EMERGENCY STOP must be carried out using electromechanical devices. - True

4. EMERGENCY STOP is always carried out using an NO contact. – False

5. Safety circuit is constructed using relays. – True.

iii. In the following ladder diagram, write the conditional routine.



**Only when Q1 is enabled, Q2 is enabled.**

**iv**. Using the Logo controller a, task is controlled is as follows.

A conveyor belt goes ON and OFF using a switch. The Edutrainer table moves in the forward direction if the green pushbutton is kept pressed and it moves in the backward direction if the white pushbutton is kept pressed. Table moves **only** if the conveyor belt is ON.

1. Create input and output list.

|  |  |
| --- | --- |
| **Inputs** | |
| Input | Address |
| Switch | I4 |
| Green pushbutton (N.O) | I1 |
| White pushbutton (N.O) | I3 |
| **Outputs** | |
| Output | Address |
| Conveyor belt motor | Q8 |
| Table forward | Q5 |
| Table backward | Q6 |

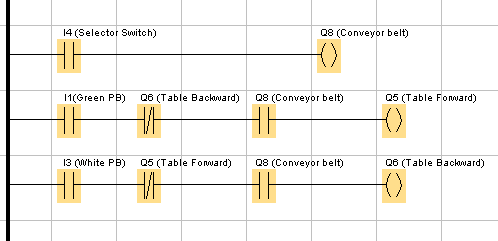
1. What is the condition in this control task?

To move the table the conveyor belt must be ON

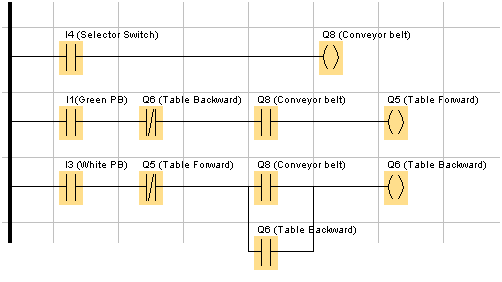
1. Analyze the system requirements and write the Boolean expression for each output.

|  |  |  |
| --- | --- | --- |
| Output | Requirements | Boolean expression |
| Conveyor belt | It goes ON and OFF using the switch (I4) |  |
| Table forward | Green pushbutton is pressed and conveyor belt is moving  (interlock must be used) |  |
| Table backward | White pushbutton is pressed and conveyor belt is moving  (interlock must be used) |  |

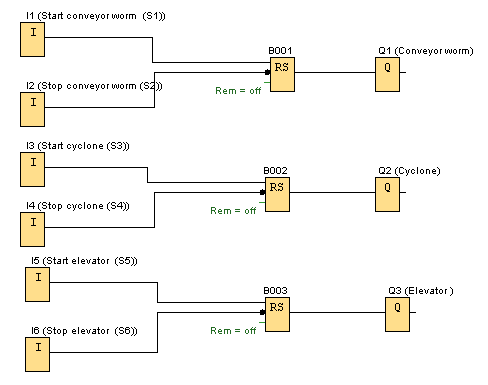
1. Draw the Ladder diagram for this control task.



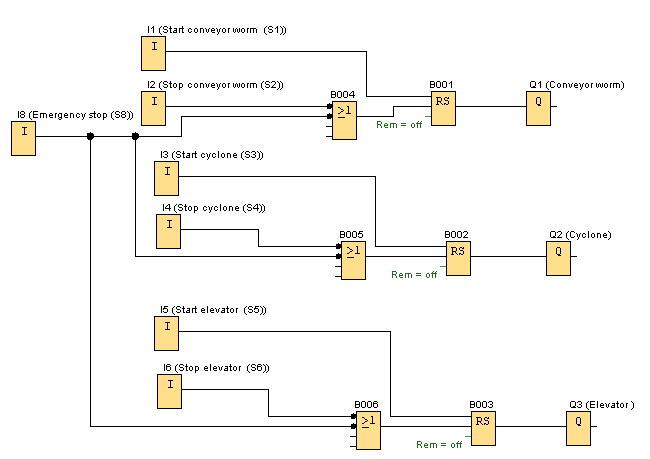
1. In the previous control task modify the ladder diagram so that the Edutrainer table can be switched OFF independently after switching OFF the conveyor belt.



v. Draw a FBD for a grain store to start and stop each stage.

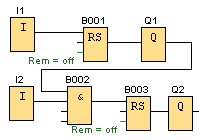


Modify the above ladder diagram with emergency stop.



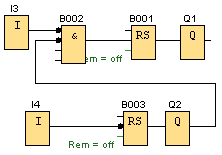
Draw a sequential start circuit,and explain its condition .

To create a **sequential-start** circuit, the output of the previous stage should be used as a **SET** input for the current stage .



Draw a sequential stop circuit and explain its condition.

To create a **sequential-stop** circuit, the output of the next stage should be used as a **RESET** input for the current stage .



**Step sequence** is a sequential control circuit in which one step is done every time the input is triggered.

Pulse relay programming block has three inputs; like in the normal RS latch block **input S is used** **to set the output Q to logic 1 and input R is used to set the output Q to logic 0.**

Pulse relay programming block there is a third input that is Trg. **Input Trg is used to toggle the** **status of the output Q.**

**High signal at Trg changes the output from ON to OFF or from OFF to ON** **when both S and R** **are 0,**

input **Trg does not influence** the output when S = 1 or R = 1.